STRUCTURE AND MATERIAL FOR ASSEMBLING A LOW-K SI DIE TO ACHIEVE A LOW WARPAGE AND INDUSTRIAL GRADE RELIABILITY FLIP CHIP PACKAGE WITH ORGANIC SUBSTRATE

ABSTRACT OF THE DISCLOSURE

Provided are a semiconductor low-K Si die flip chip package with warpage control and fabrication methods for such packages. The packages include heat spreaders that are attached to the low-K Si die and packaging substrate. In general, the modulus of the thermal interface material, which is used to attach the heat spreader to the low-K Si die, is selected as high as possible relative to other commercially available thermal interface materials. On the other hand, the modulus of the adhesive, which is used to attach the heat spreader via an optional stiffener to the substrate, is selected as low as possible relative to other commercially available adhesives. The result is a package with less bowing and so improved co-planarity (in compliance with industry specifications) with the surface to which it is ultimately bound. Moreover, the low-K Si die and package reliabilities are thereby enhanced.